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AUTHOR Hock, Winand K.
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ABSTRACT

This fact sheet gives the acute oral and dermal toxicity (LD 50) of over 250 pesticides in lab animals. The chemicals are categorized as fungicides, herbicides, insecticides, or miscellaneous compounds. One or more trade names are given for each pesticide. In addition, a brief explanation of toxicity determination is given. (SB)

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AGRICHEMICAL FACT SHEET

2

Toxicity of Pesticides

Toxicity is defined as the extent or degree to which a chemical substance is poisonous to humans and other animals. All pesticides must be toxic or poisonous to a certain extent in order to kill or cause injury to a target pest. Toxicity varies greatly among different pesticides; however, for each pesticide the level of toxicity is fairly uniform for a specific kind or group of animals, but it may vary considerably among different or unrelated species of animals. Persons using pesticides should at least have a general knowledge of the relative toxicity of the products they are using.

The toxicity of a particular pesticide is determined by subjecting test animals, usually rats, mice, and rabbits, to different dosages of the active ingredient in a pesticide product — that portion of the formulation which is toxic to the pest.

The toxicity of each active ingredient is determined by at least three methods: (1) oral toxicity, by feeding the chemical to test animals; (2) dermal toxicity, by exposing the skin to the chemical; and (3) inhalation toxicity, by making the test animals breathe vapors of the chemical. In addition, the effect of the chemical as an irritant to the eyes and skin is examined under laboratory conditions.

Toxicity is usually expressed as LD 50 (lethal dose 50) and LC 50 (lethal concentration 50). This is the amount or concentration of a toxicant (the active ingredient) required to kill 50 percent of a test population of animals under a standard set of conditions. Toxicity values of pesticides, based on a single dosage, are recorded in milligrams of pesticide per kilogram of body weight of the test animal (mg/kg) or in parts per million (ppm). LD 50 and LC 50 are useful in comparing the toxicity of different active ingredients in pesticides. *The lower the LD 50* of a pesticide, *the greater the toxicity* of the chemical to man and animals. Pesticides with high LD 50s are the least toxic to man when used according to directions on the product labels.

Pesticides are categorized on the basis of their LD 50 or LC 50 values. Those pesticides which are classified as highly toxic on the basis of oral, dermal, or inhalation toxicity must have the signal words DANGER and POISON (in red letters) and a skull and crossbones prominently displayed on the package label. As little as a few drops of such material taken orally could be fatal to a 150-pound person. Acute (single dosage) oral LD 50s for pesticides in this group range from a trace to 50 mg/kg.

Pesticides considered as moderately toxic must have the signal word WARNING displayed on the product label. Acute oral LD 50s range from 50 to 500 mg/kg. From one teaspoon to one ounce of this material could prove fatal to a 150-pound person.

Pesticides classified as either slightly toxic or relatively nontoxic are required to have the signal word CAUTION on the pesticide label. Acute oral LD 50 values are greater than 500 mg/kg.

Despite the fact that some pesticides are considered to be only slightly toxic or relatively nontoxic, all pesticides can be hazardous to man, nontarget animals, and the environment if not used according to the instructions on the product label. Use the pesticide only as recommended by the manufacturer. As the applicator, you are legally responsible if a pesticide is misused in any way.

Acute oral and dermal LD 50 values of some of the more commonly used pesticides are listed below. The common chemical name of the active ingredient, followed by examples of trade names (in parentheses) is listed in the first column. Where common names are not available or are not generally used in the literature, only trade names are included.

Fungicides Pesticide	Acute Oral LD 50 (mg/kg, rat)	Acute Dermal LD 50 (mg/kg, rabbit)
Benomyl (Benlate, Tersan 1991)	> 9,590	
(Busan)	1,590	
Captafol (Difolatan)	6,200	
Captan (Orthocide)	9,000	
Carboxin (Vitavax)	3,820	> 8,000
Chloroneb (Demosan, Tersan SP)	11,000	
Chlorothalonil (Bravo, Daconil 2787, Termil)	>10,000	>10,000
Copper hydroxide (Kocide)	1,000	
Cycloheximide (Acti-dione)	2	
	133 (mouse)	
DCNA (Botran)	> 5,000	
(Dexon)	60	100
Dinocap (Karathane)	980	9,400
Dodine (Cyprex)	1,000	> 1,500
(Dyrene)	2,710	
Ethazol (Terrazole, Koban, Truban)	2,000 (mouse)	
Fentin hydroxide (Du-ter)	108	
Ferbam (Fermate, Ferbam Flowable, Vancide-FE95)	>17,000	
Folpet (Phaltan)	>10,000	
Hexachlorobenzene (HCB Bunt-No-More, No Bunt)	10,000	
Hexachlorophene (Isobac, Nabac)	320	
Mancozeb (Dithane M-45, Fore, Manzate 200)	7,500	
Maneb (Dithane M-22, Manzate, Tersan-LSR)	6,750	
(Morestan)	2,500	
Nabam (Dithane D-14)	395	
Oxycarboxin (Plantvax)	2,000	>16,000
Parinol (Parnon)	5,000	
Pentachloronitrobenzene (PCNB, Terrachlor)	12,000	
Pentachlorophenol (PCP, Penta, Dowcide 7)	210	
Piperalin (Pipron)	2,500	

SE 024 067

Pesticide	Acute Oral LD 50 (mg/kg, rat)	Acute Dermal LD 50 (mg/kg, rabbit)
PMA Phenylmercuric acetate (Polyram)	60 6,200	
Sodium pentachlorophenate (Pentaphenate)	210	
Streptomycin (Phytomycin, Agri-Strep, Agrimycin 17)	9,000	
Sulfur	Nontoxic	
Thiabendazole (TBZ, Mertect)	3,100	
Thiophanate (Topsin, Cleary 3336, Cercobin)	>15,000	
Thiophanate methyl (Topsin M, Fungo, Cercobin M)	7,500	
Thiram (Thylate, Arasan, Tersan 75, Vancide TM-95)	780	
Triforine (Cela W 524)	>16,000	
2-aminobutane (Frucote, Tutane)	380	
Zineb (Dithane Z-78, Parzate, Vancide Zineb 85)	> 5,200	
Ziram (Zerlate, Vancide MZ-96)	1,400	

Herbicides

Pesticide	Acute Oral LD 50 (mg/kg, rat)	Acute Dermal LD 50 (mg/kg, rabbit)
Alachlor (Lasso)	1,800	5,000
Allyl alcohol	64	
Ametryn (Evik)	1,110	>10,020
Amitrole (Amizol, Weedazol, Amino Triazole Weed Killer)	24,600	>10,000
Ammonium sulfamate (AMS, Ammate)	3,900	
Arsenic acid (Desiccant L-10)	48-100	
Asulam (Asulox)	> 8,000	
Atrazine (AAtrex)	3,080	
Benefin (Balan)	>10,000	
Benusulide (Betasan, Prefar)	770	3,950
Bentazon (Basagran)	1,100	2,500 (rat)
Benthiocarb (Saturn)	1,903	2,900 (rat)
Bifenox (Modown)	> 6,400	>20,000
Borate, Borax (Hibor, Ureabor, Borocil mixture)	2,000-5,560	
Bromacil (Hyvar, Krovar, Borocil mixture)	5,200	
Bromoxynil (Bronate, Brominal)	260-440	> 3,660
Butylate (Sutan)	4,659	> 4,640
Cacodylic acid (Phytar 138, Rad-E-Cate)	830	
CDAA (Randox)	750	
CDEC (Vegadex)	850	
Chloramben (Amiben, Vegiben, Weedone Garden Weeder)	3,500	
Chlorbromuron (Bromex, Maloran)	> 2,150	>10,000
Chloroxuron (Norex, Tenoran)	3,700	>10,000
Chlorpropham (Furloe, Sprout Nip, Chloro-IPC)	3,800	10,200
Cyanazine (Bladex)	334	> 2,000
Cycloate (Ro-Neet)	2,000-4,100	> 4,640
Cyprazine (Outfox)	1,000-1,400	
2,4-D	> 300	
Dalapon (Dowpon)	7,570	

Pesticide	Acute Oral LD 50 (mg/kg, rat)	Acute Dermal LD 50 (mg/kg, rabbit)
2,4-DB (Butoxone, Butyrac)	1,960	>10,000
DCPA (Dacthal)	3,000	10,000
Diallate (Avadex)	395	
Dibutalin (Amex 820)	1,000	
Dicamba, dimethylamine salt (Banvel)	1,028	
Dichlobenil (Casoron)	3,160	1,350
Dichlorprop; 2,4-DP	800	
Difenzoquat (Avenge)	470	3,540
Dinitramine (Cobex)	3,000	> 2,000
Dinoseb (Premerge, Basanite)	58	100-200 (guinea pigs)
Diphenamid (Dymid, Enide)	1,000	
Diquat (cation only) (Ortho Diquat)	230	> 400
Diuron (Karmex, Krovar)	3,400	
Endothall (Aquathol, Hydrothol, Mariner)	51	
EPTC (Eptam, Eradicane)	1,652	[illegible]000
Erbon	1,120	
Fenac	1,780	
Fenuron TCA (Urab)	4,000-5,700	
Fluchloralin (Basalin)	1,550	
Fluometuron (Cotoran, Lanex)	7,900-8,900	
Fluorodifen (Preforan, Soyex)	>15,000	
Glyphosate (Roundup)	4,320	
Isopropalin (Paarlan)	5,000	
Karbutilate (Tandex)	3,000	>15,400
(Krenite)	24,000	
Linuron (Lorox)	1,500	
MAA; Methanearsonic acid; MAMA; MSMA; DSMA (Ansar, Trans-Vert, Weed-E-Rad)	700-1,800	
MCPA (Chiptox, Rhomene, Dow MCP Amine Weed Killer, Weedar Sodium MCPA)	800	
MCPB (Can-Trol, Thistrol)	700	
Mecoprop, MCPP	650	900
Methazole (Probe)	1,350	>10,200
Metolachlor (Dual)	2,780	>10,000
Metribuzin (Lexone, Sencor)	1,937	
Molinate (Ordram)	501-720	
Monuron (Telvar)	3,600	
Napropamide (Devrinol)	> 5,000	> 4,640
Naptalam, sodium salt (Alanap)	1,770	
Nitralin (Planavin)	> 2,000	> 2,000
Nitrofen (Tok)	2,630	
(Nortron)	1,200	
Oryzalin (Surflan)	>10,000	> 2,000
Paraquat (cation only)	120	> 480
Pebulate (Tillam)	1,120	4,640
Pentachlorophenol (PCP)	210	
Phenmedipham (Betanal)	> 8,000	4,000 (rat)
Picloram (Tordon)	8,200	> 4,000
Potassium azide	60-80	37
Procyazine (Cycle)	290	> 3,000
Profluralin (Tolban)	2,200	>10,250
Prometone (Pramitol)	2,980	
Prometryne (Caparol)	3,750	

Pesticide	Acute Oral LD 50 (mg/kg, rat)	Acute Dermal LD 50 (mg/kg, rabbit)
Pronamide (Kerb)	5,620-8,350	> 3,160
Propachlor (Ramrod)	710	
Propanil (Stam)	1,384	
Propazine (Milogard)	> 5,000	
Propham (IPC, Chem-Hoe)	9,000	6,800
Pyrazon (Pyramin)	3,600	
Siduron (Tupersan)	> 7,500	
Silvex (Kuron, Weedone 2,4,5-TP)	650	
Simazine (Princep)	> 5,000	
Sodium arsenite	10-50	
Sodium azide	27	118 (16% G)
Sodium chlorate	1,200	
(Sustar), diethanolamine salt	2,580	> 4,000
2,4,5-T, acid	500	
2,3,6-trichlorobenzoic acid (Benzac, Trysben 200)	1,370	
TCA, trichloroacetic acid	5,000	
Tebuthiuron (Spike)	644	
Terbacil (Sinbar)	5,000-7,500	
Trifluralin (Treflan)	>10,000	
(Velpar)	1,690	
Vernolate (Vernam)	1,780	

Insecticides

Pesticide	Acute Oral LD 50 (mg/kg, rat)	Acute Dermal LD 50 (mg/kg, rabbit)
Acephate (Orthene)	866	> 2,000
(Akton)	146	177
Aldicarb (Temik)	1	5
Aldrin	39-60	50-80
Allethrin	680-1,000	>11,200
Aminocarb (Matacil)	30	[illegible]
Amitraz (Baam)	600-800	> 1,600
(Aspon)	891	
Azinphos-methyl (Guthion)	13-16	220
Bacillus thuringiensis (Biotrol, Dipel, Thuricide)	Nontoxic	
Bendiocarb (Ficam)	143	
BHC, benzene hexachloride	600-1,250	
Binapacryl (Morocide)	150	1,010-1,690
(Bux)	87-170	400
Calcium arsenate	35-100	
Carbaryl (Sevin)	307-986	2,000
Carbofuran (Furadan)	8-14	>10,200
Carbophenothion (Trithion)	30	
Chlordane	283-590	780
Chlordecone (Kepone)	95-140	345-475
Chlordimeform (Fundal, Galecron)	127-352	> 3,000
Chlorobenzilate (Acaraben)	960	> 1,000-3,000
Chloropropylate (Acaralate)	5,000	>10,200
Chlorpyrifos (Dursban, Lorsban)	163	2,000
Coumaphos (Co-Ral)	56-230	860 (rat)
Crotoxyphos (Ciodrin)	125	385
Crufomate (Ruelene)	770	2,000-4,000
Cryolite	10,000	
Cyhexatin (Plictran)	540	> 2,000
DDT	113	2,820
DDVP, Dichlorvos (Equigard, Vapona, Vaponite)	56	107
Demeton (Systox)	2-12	24
Dialifor (Torak)	43-53	145
Diazinon (Diazinon, Spectracide)	300	4,000
Dicofol (Kelthane)	809	2,100
Dicrotophos (Bidrin)	22	225
Dieldrin	46-63	250-360
(Dimilin)	>10,000	
Dimethoate (Cygon, De-Fend, Rebelate)	320-380	700-1,150
Dinocap (Karathane)	980	9,400
Dioxathion (Delnav)	40	107
Disparlure	>34,600	> 2,025
Disulfoton (Di-Syston)	2-12	20 (rat)
Endosulfan (Thiodan)	18-110	360
Endrin	5-45	60-120
(EPN)	33	30-50
Ethion	70	915
Ethoprop (Mocap)	62	26
Famphur (Warbex)	35-62	1,460-5,093
Fenbutatin-oxide (Vendex)	2,630	> 2,000
Fenchlorphos (Ronnel, Korlan Trolene)	1,740	1,000-2,000
Fensulfothion (Dasanit)	2-10	3-30 (rat)
Fenthion (Baytex, Entex, Tiguvon)	250-300	330 (rat)
Fonofos (Dyfonate)	8	147
Formetanate (Carzol)	20	>10,200
Heptachlor	40-188	2,000
Kinoprene (Enstar)	5,000	9,000
Lead arsenate	10-50 (man)	
Leptophos (Phosvel)	43	
Lindane (Gamma BHC, Isotox)	88	1,000 (rat)
Malathion	1,375	4,100
Methidathion (Supracide)	25-48	375
Methiocarb (Mesurol)	87-130	>2,000 (rat)
Methomyl (Lannate, Nudrin)	17	> 1,000
Methoprene (Altosid)	>34,600	> 3,500
Methoxychlor (Marlate)	6,000	
Methyl parathion (Methyl Niran, Penncap-M)	9-25	300-400
Mevinphos (Phosdrin)	3-7	13-55
Mexacarbate (Zectran)	15-63	> 500
Mirex	306	800
(Monitor)	21	118
Monocrotophos (Azodrin)	21	354
(Morestan)	2,500	> 2,000 (rat)
Naled (Dibrom)	430	5,000
Nicotine sulfate	50-91	50
Oxamyl (Vydate)	5	2,960
Oxydemeton-methyl (Metasystox-R)	65	100-250 (rat)
Parathion (Niran, Phoskil)	13	40
(Pentac)	3,160	> 3,160
(Perthane)	8,170	
Phorate (Thimet)	2	70-300
Phosalone (Zolone)	120	> 2,000
Phosmet (Imidan, Prolate)	147-299	> 3,160
Phosphamidon (Dimecron)	20	267
Piperonyl butoxide-synergist	> 7,500	> 1,880

Pesticide	Acute Oral LD 50 (mg/kg, rat)	Acute Dermal LD 50 (mg/kg, rabbit)
Pirimicarb (Pirimor)	147	> 500
Propargite (Omite)	2,200	> 1,200 (rat)
Propoxur (Baygon)	100	> 1,000 (rat)
Pyrethrin	200-2,600	> 1,800 (rat)
Resmethrin (SBP-1382)	1,500	> 3,040 (rat)
Rotenone	132	> 1 000
Ryania	1,200	> 4,000
Sulfotepp	7-10	
Temephos (Abate)	8,600	> 4,000
TEPP	2	5
Terbufos (Counter)	4	
Tetrachlorvinphos (Gardona, Rabon)	4,000	> 5,000
Tetradifon (Tedion)	>14,700	> 1,000
(Thanite)	1,603	6,000
Toxaphene	69	780-4,000
Trichlorfon (Dipterex, Dylox, Neguvon, Proxol)	450	5,000

Miscellaneous Compounds

Pesticide	Class of Compound[1]	Acute Oral LD 50 (mg/kg, rat)	Inhalation Toxicity[2] (ppm)
Acrylonitrile	F		100
Ancymidol (A-Rest)	GR	4,500	
Antu	R	6 (Very low human toxicity)	
(Avitrol)	A	20	
(Bayluscide)	M	500	
Calcium cyanide (Cyanogas)	F	40 (minimum lethal dose, man)	
Carbon disulfide	F		200
Carbon tetrachloride	F	5,730	300
Chlorflurenol (Maintain-CF 125)	GR	3,100	
Chlormequat (CCC, Cycogel)	GR	670	
Chlorophacinone (Rozol)	R	20	
Chloropicrin	F		1
Chlorphonium (Phosfon)	GR	178	
(Compound 1080)	R	0.22	
(Compound 1081, Fluorakil 100)	R	6	
Daminozide (Alar, B-Nine)	GR	8,400	
DBCP (Nemagon, Fumazone)	F, N	173	100
(D-D mixture, Dowfume N, Vidden D)	F	140	500
(DEF)	D	325	
Dichloropropene (Telone)	F	250-500	500
Diphacinone (Diphacin, Ramik)	R	3	
Ethephon (Ethrel, Cepha)	GR	4,229	
Ethylene dibromide (EDB)	F	117	200
Ethylene dichloride (EDC)	F	670	1,000
Ethylene oxide	F	72	500
Formaldehyde	F	One ounce can cause death	
(Fumarin)	R	25	
Gibberellic acid (GA, Gibrel)	GR	6,300	
Hydrogen cyanide	F		40
Indolebutyric acid (IBA)	GR	100 (mouse)	
Maleic hydrazide (MH-30, Sucker-stuff, Retard)	GR	3,900	
Merphos (Folex)	D	1,272	
Metaldehyde	M	630	
Methyl bromide	F		200
Naphthalene	F		100
Naphthalene acetamide	GR	1,000	
Naphthalene acetic acid (NAA)	GR	1,000	
(Ramacur)	N	8-9	
(Off-Shoot-O)	GR	20,500	
(Off-Shoot-T, Sucker Plucker)	GR	18,000	
(Ornitrol)	A	470	
Paradichlorobenzene, PDB	F	1,000	500
Phosphine (Phostoxin)	F		25
(Pival, Pivalyn, Duocide)	R	30	
Propylene oxide	F		1,000
(Raticate)	R	5	
(Red squill)	R	0.7	
(Starlicide)	A	1,170	
Strychnine	R	1-30	
Sulfuryl fluoride (Vikane)	F		400
(Vacor)	R	12	
(Vapam, VPM, SMDC)	F	820	
(Vorlex)	F	175	
Warfarin	R	186	
Yellow phosphorus	R	100 mg fatal to humans	
Zinc phosphide	R	46	

[1] A-avicide, D-defoliant, F-fumigant, GR-growth regulator (plants), M-molluscicide, N-nematicide, R-rodenticide.

[2] Maximum single one hour exposure believed safe for humans.

Prepared by Winand K. Hock
Extension Pesticide Specialist

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